SCIENCE.

FRIDAY, DECEMBER 28, 1883.

THE CHIEF SIGNAL-OFFICER'S REPORT.

THE report proper of the chief signal-officer of the army for the year ending June 30, 1883, has been published in advance of the complete volume, which will contain the usual appendices. When compared with those of previous years, it presents a marked and most gratifying contrast. The useless and tiresome repetition of much that has appeared regularly since the organization of the service is no longer indulged in; and, in fact, the present report is brief, fresh, and vigorous. It is pleasant to see, that, among the various topics discussed, the first place is given to 'Instruction in meteorology.' Although somewhat crippled by lack of sufficient appropriation, this work has not been allowed to retrograde; and the encouraging fact is noted, that, out of a hundred and seventy-two enlistments made during the past two years, fifty-three were college graduates.

Gen. Hazen argues ably and pointedly against the inadequate provision made by the last Congress. The separation of the signal-service from the army proper, as far as its support from the general appropriation goes, undoubtedly left the service in a worse condition, even, than was intended by those who sought to reduce its expenditures. The result has been, that a number of stations have necessarily been closed, and much important work of the weather bureau has been suspended. It is certainly to be hoped that it may receive more generous treatment at the hands of the present Congress.

An interesting *résumé* of the scientific work of the weather bureau is given, which indicates a commendable activity in that direction. One of the most important announcements is, that a new standard of thermometry has been adopted "which no longer agrees with that of the Yale college observatory, but approaches more nearly to that of the International bureau of weights and measures." Another is, that steps have been taken to inaugurate in the immediate future a series of elaborate observations upon atmospheric electricity. The continuation of the publication of 'Professional papers' by members of the scientific corps is noted, one of the most important of which is that on 'Movements of the atmosphere,' by Professor Ferrel. It is gratifying to observe throughout the report, that scientific meteorology is receiving a recognition to a degree much greater than formerly.

A brief history of the unfortunate Greely expedition is presented, and the statement made that it is intended to apply for an appropriation to enable another relief expedition to be sent out in 1884.

The report covers twenty-two pages, instead of three or four times that number, as was the case in previous years; but, as a report of progress for the year, it is much more valuable than its predecessors. A similarly judicious treatment of the appendices and meteorological summaries, which will follow this report, would bring the whole into a much more useful and manageable form, and would not be the least important of the many reforms introduced into the service by its present chief.

ROMALEA MICROPTERA.

SHOULD the return of spring be early, and the winter just passed an open one, a rambler in the meadows of southern Louisiana is very likely, during the middle of February, or perhaps even earlier, to have his attention drawn to curious little colonies of red and black grasshoppers.

These are the young of Romalea microptera. Until this summer I never saw a living adult specimen of this handsome insect, and my examination of it had been confined to a few individuals in alcohol. No sooner, however, had I thoroughly examined one of these little

red and black colonists, than it struck me that they must be the young of the great black grasshopper I had seen in spirit. This was subsequently confirmed for me through the kindness of Mr. L. O. Howard, of the Agricultural department at Washington. One day last March, during the first part of the month, while on one of my collecting excursions in this country, my way lay through an extensive cypress-swamp. The only good footing was along a low, straight embankment, that had been made by the earth thrown out to dig a canal, to which it now formed the bank on one side. It was composed of a dry, black soil, upon which the new spring grass and the earlier plants had just commenced to make their appearance. It was here that I first came across a family, or brood rather (for no old ones are to be found at this time of the year), of the young grasshoppers in question. They extended obliquely across my path in nearly a straight line, about half a yard in length, and from three or four to a dozen or more individuals in width. Where small dry twigs occurred, or blades of grass, in their course, they completely covered them, and were so packed together that in some parts of the group they crowded each other a good deal. When first discovered, little or no activity among them was apparent; but no sooner did I commence to lay in a store of specimens than the survivors of my attack immediately began to hop off in all directions, obliging me very soon to make single captures. At this stage of their growth, these insects are about of the same size, having an average length of a centimetre; their general color being a deep, shiny black. This is set off by fine lines of brilliant vermilion, occurring at different places on the body. One strip extends mesiad, the entire length of the dorsal aspect, from a point between the antennae to the posterior extremity of the abdomen; another bounds, on either side for a short distance, the hinder margin of the prothorax; while the same is found behind the whole length of each of the hind-femora. The lower and posterior angle of the epicranium is also bordered by the same color as is its inferior margin in front, and a line that extends down from the eye on either side to join it. Finally we observe that each abdominal ring is emarginated in the same way, along the ridges of the pleurite portions, below the spiracles. At this age the antennae are half as long as the body.

A few weeks later, when they are about double the size I have just described, we begin to observe in these collections, which are apparently all of the same crop, some specimens considerably larger than the general run. These may be females, but this I cannot positively assert: though, as the insect grows, these larger ones maintain their size over the others; and later in the year we find them to be females, notwithstanding the sexes at these times seem to be pretty equally divided in numbers.

In the middle of June, a field in the vicinity of New Orleans, where the grass had grown to be about waist-high, was covered in one or two places of no great extent with these grasshoppers. They now ranged from four to five centimetres in length, and could be seen at several hundred feet distance. Other varieties of plants were covered with them; but I found none on the ground, unless they were accidentally knocked down, or jumped down when one failed in his efforts to capture them.

At these times they are very sluggish, emitting no sound or note that I ever heard, and do not seem to be feeding on the vegetation upon which they congregate. Their colors are now somewhat changed; and, though the black is as deep and shiny as ever, the red gradually fades to a brilliant orange, and a small pair of dull black wings commences to make its appearance.

In the country about New Orleans, Romalea seems to attain its full growth some time in the early part of July. This is denoted by the general appearance and habits of the insect: certain parts of his exoskeleton have become firm and hard, and all his structures and organs bear evidence of maturity. They are no longer found in groups in the meadows and forests, but dispersed, and occurring in all sorts of localities. Hundreds of them are found invading the cow-paths and roadways: others climb on fences and trees. Many still are yet observed, though now usually singly, on high grass and plant-stalks; and these we may easily discern at a long distance in the open fields. Even our houses are not altogether exempt, at this season, from this black-mailed vagrant. Many are killed by being trodden upon, or accidentally crushed in other ways; for they are slow to get out of one's road, and disinclined to jump much, — a feat in which the males, from their lighter weight, far exceed the larger and heavier females.

It is about this time of the year that we first begin to notice any thing approaching an *affaire d'amour* on the part of this now truly handsome insect. We now see many couples apparently regardless of those who behold their awkward and highly fantastic addresses. The

only sound that I have ever heard this grasshopper give vent to, is now indulged in by the male. It consists simply of a series of peculiar hisses (this word expresses it better than any thing else), and is only heard when we seize and handle one of them, or during their mating. The sound seems to be produced largely by the wings; for these members are elevated at this time, as I have shown them in my plate, where the male exhibits his beautiful hind-wings, — a relief to his otherwise sombre tints that is only to be experienced on such occasions.

I am of the impression that Romalea does not confine itself to any particular diet, but is rather a general feeder, choosing such plants as happen to fall in its way. Some of them, that I kept alive for several days in a large box, fed upon almost any thing in the shape of vegetable growth that I offered them.

This view seems to be sustained by the report of Mr. L. O. Howard, who saw them in August in immense numbers in the rice-fields about the city of Savannah; 'yet they seemed to do little damage to the rice.'[1]

This observer tells us in the same report, that they are known in that locality among the people as the 'lubber grasshopper,' whereas, throughout this section of the country, they are called by every one the 'devil-horse.' Perhaps, if at one of their grand councils they had a choice in the matter, it would be hard for them to decide which was the prettier name, and no doubt they would vote unanimously to select some other one.

It has never been my fortune to find examples of the black variety of the female in southern Louisiana, as observed by entomologists elsewhere.[2]

On the 28th of last July, while engaged in looking for a specimen of the prothonotary warbler, which I had just brought down with my cane-gun from a magnolia under which I stood, my attention was attracted by a large female Romalea, with part of her abdomen buried in the ground, and evidently in the act of depositing her eggs. A chapter in the history of this insect at once flashed across my mind; and, in my undue eagerness, I removed her at once from the little excavation she was in on the ground; but the most careful search afterwards was not rewarded by the discovery of a single egg. However, the satisfaction was afforded me, at the subsequent *post mortem* of the specimen in question, of finding her ovaries containing upwards of fifty bright-yellow, spindle-shaped eggs, each about a centimetre long.

[1] Report commiss. agric., 1881-82, p. 138. [2] *Ibid.*, p. 138.

This circumstance convinced me that Romalea microptera deposits its eggs in the ground; and from that time I did not allow an opportunity to slip in searching for them. My interest in this matter was only increased by receiving a letter, a few days afterwards, from Mr. Howard, in which he informed me that it was not known where this grasshopper laid its eggs. I am sorry to say that I have not had the opportunity to examine the reports made by Glover upon this insect, in the report of the Department of agriculture for 1872, kindly called to my attention by my correspondent, nor the mention made of it in Ashmead's 'Orange insects,' also referred to by him.[1]

My search was, however, afterward rewarded; for on the 15th of August, while passing through a long, flat meadow a few miles from New Orleans, I came, at one end of it, to a little low mound about ten yards in extent, composed of a dry black earth, that was cracked and fissured in many directions by a sun that streams down here almost as mercilessly as in the tropics. Many tall weeds and grasses surrounded this miniature hillock, and others grew upon it.

Romalea had made this elevation its headquarters, and it was at the same time a rendezvous for many couples who had apparently postponed their honeymoons. The importance of the occasion was evident; for there was not a male on the ground, to say nothing of the majority who were perched up in the weeds, but was strutting about in the most business-like manner, or trying to do so on their perches in the latter. Whatever part of the entertainment these sable gentlemen entered into, they constantly kept up a very audible buzzing racket with their wings, which they elevated and lowered at few seconds' intervals, showing the inferior carmine pair each time they did so, with telling effect. At these times they assume the position in which I have drawn one in the plate, walking about in a stilted manner, but bearing, withal, a dignified mien, rattling their wings, and paying their court to the quieter and more sedate opposite sex.

Some of the females kept apart, and bore the appearance of being dejected, tired of the gayeties of the season, and otherwise bored by the proceedings that were going on everywhere about them. It was the sight of these satiated dames that soon brought the thought to my

[1] I have since ascertained that Mr. Charles R. Dodge, of the Agricultural department of Washington, has raised the young of Romalea from eggs that were laid by specimens he kept in confinement. He published his observations in the *Rural Carolinian* (April, 1874, p. 363, vol. v., no. vii.), Charleston, S.C.; and subsequently in the *Field and forest* (ii. 1877, p. 160), Washington, D.C.

mind, that perhaps they laid their eggs here too; and acting immediately upon this, as well as the suggestive fissures in their camping-ground caused by the sun, I proceeded to investigate those likely places in which they might deposit their ovicular treasures. These rents presented every stage of being filled in from one cause or another; and I had hardly commenced to scratch out the earth from one that was partially in this condition, than I came across masses of their eggs. They were not easily observed at first, as I turned them out with the stick I used in searching for them, from the fact that they resembled lumps of earth, as this substance adhered to their entire surface, either dusted over, or in little fragments, which latter rendered the resemblance still more deceptive. My plate represents one of these masses, that has been well cleaned off, in the lower right-hand corner (marked *A*). I have four before me that were collected at the time of my observations, and one of these is that figured in the plate.

The first of these masses that I pick up contains about thirty-five eggs, of a like size and shape to those removed from the body of a female several weeks before. They are in one rather irregular layer, being placed roughly parallel to each other, and entirely incased by the pellets of earth that have adhered to the mass. No true egg-pod was observed to enclose them; but, judging from the way in which the eggs of other large grasshoppers are laid, no doubt further observations will prove its existence. The eggs of this lot are all sound, and in an apparently safe condition till the time of hatching, as they were several inches below the surface of the ground. In the next collection the mass is of a circular form, with the eggs arranged pretty much as we found them in the first lot. Here, however, they are quite distinct, being simply dusted over with a little earth; and I find several of them have been opened at the sides, and their contents removed, apparently by ants or other insects. The two remaining masses are essentially of the same description as those we have just described. One is a little different in shape, being oblong instead of circular. This form may have been forced upon it from the narrowness of the fissure in which the eggs of this lot were laid. Of these four deposits, we may say that they contain an average of thirty eggs apiece; and this statement, no doubt, will be very near the correct one for the usual number found in such masses.

Examining one of these eggs under a two-inch objective, we find it composed of an outer coat, brown in color, fibrous in texture, and about 0.1 of a millimetre in thickness. The little fibres are placed side by side, and vertical to the surface of the egg. This coat fractures off in small pieces quite easily, and, in so doing, exposes the thin membranous and transparent inner coat, which allows one to see through it the amber-colored contents of the egg proper, which are of a viscid character and of about the consistency of old olive-oil.

This was the only occasion upon which I ever succeeded in finding any of the eggs of this grasshopper; and I am unable at the present writing to say how many times they deposit during a season, or how often Romalea moults during the same period.

It was my intention, when I commenced this paper, to enter to some extent upon the anatomy of this insect; but the idea was eventually abandoned from the fact that the anatomy of locusts and grasshoppers has been very ably and extensively worked up by many entomologists: so, to enter upon this subject at all in the present case would entail a minute study of details and comparisons that would result in carrying my paper much beyond its intended limits. Then, too, so far as the external appearance of Romalea is concerned, I have made every effort to convey a correct idea in my plate, both of the male and the female; and this work has been most carefully and beautifully reproduced by my engravers, Messrs. T. Sinclair and Son of Philadelphia, — a firm to whom our scientific men are under so many obligations for faithful reproductions of their work. This sketch, in its present form, then, is offered to the readers of SCIENCE as a contribution to the life-history of Romalea microptera; and it is hoped that in it at least a few facts will be discovered that will prove of interest to entomologists.

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RESOLUTIONS OF THE INTERNATIONAL GEODETIC COMMISSION IN RELATION TO THE UNIFICATION OF LONGITUDES AND OF TIME.

THE seventh general conference of the International geodetic association held at Rome, and at which representatives of Great Britain, together with the directors of the principal astronomical and nautical almanacs and a delegate from the Coast and geodetic survey of the United States, have taken part, after having deliberated upon the unification of longitude by the adoption of a single initial

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R.W. Shufeldt, del.

T. Sinclair & Son, Lith Phila.

ROMALEA MICROPTERA.